

Abstract No. Haeh0328

## Conformational Order in Oligo(Ethylene Glycol)-Terminated Self-Assembled Monolayers Adsorbed on Gold

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Beamline(s): U1A

**Introduction:** There is an increasing interest in ultrathin organic films that can resist the non-specific adsorption of proteins, since they are expected to play a pivotal role in potential applications, such as biosensors. Oligo(ethylene glycol) (OEG) containing self-assembling monolayers are promising candidates for such films [1]. The mechanism underlying their inertness, however, is still not completely resolved. It has been suggested that order and orientation play a central role [2].

**Methods and Materials:** We investigated the conformational order of a series of such molecules with different numbers of ethylene glycol (EG) units (Figure 1) by Near Edge X-Ray Absorption Fine Structure Spectroscopy (NEXAFS).

**Results:** Figure 2 displays spectra recorded for grazing and normal incidence at the C1s edge. There is some angular dependence observable for those molecules with only a few EG units, which however, vanishes with increasing number. A more detailed data evaluation reveals that the OEG part is more likely to be disordered than in a helical conformation for all films.

**Conclusions:** Since all films show protein resistance and the mechanism is similar for those with less than 10 EG units, the order appears to play a minor role in the ability of these films to repel proteins.

**Acknowledgments:** This study was supported by the Swiss National Science Foundation (SNF). National Synchrotron Light Source (NSLS) is supported by the U.S. Department of Energy.

### References:

[1] K.L. Prime and G.M. Whitesides *J. Am. Chem. Soc.* **115**, 10714 (1993)

[2] P. Harder, M. Grunze, R. Dahint, G.M. Whitesides and P.E. Laibinis *J. Phys. Chem. B* **102**, 426 (1998)

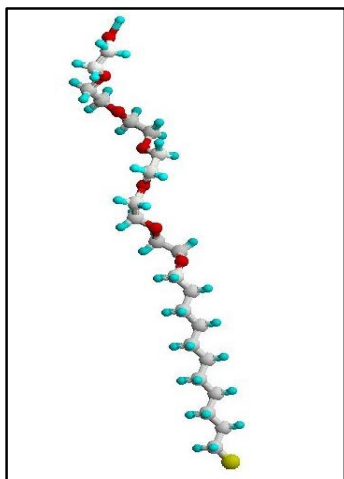


Fig.1: Oligo(ethylene glycol) terminated alkanethiol

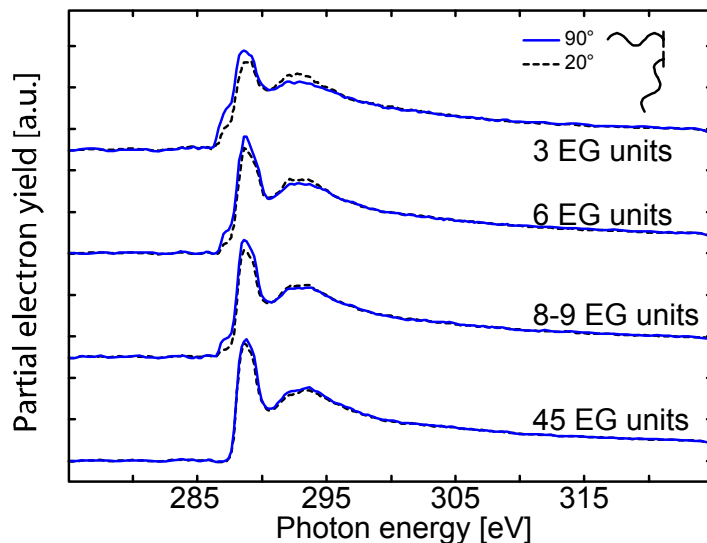


Fig.2: C1s NEXAFS spectra for oligo(ethylene glycol)-terminated alkanethiols